

Synopsis

Vectors and tensors are among the most powerful problem-solving tools available, with applications ranging from mechanics and electromagnetics to general relativity. Understanding the nature and application of vectors and tensors is critically important to students of physics and engineering. Adopting the same approach used in his highly popular *A Student's Guide to Maxwell's Equations*, Fleisch explains vectors and tensors in plain language. Written for undergraduate and beginning graduate students, the book provides a thorough grounding in vectors and vector calculus before transitioning through contra and covariant components to tensors and their applications. Matrices and their algebra are reviewed on the book's supporting website, which also features interactive solutions to every problem in the text where students can work through a series of hints or choose to see the entire solution at once. Audio podcasts give students the opportunity to hear important concepts in the book explained by the author.

Book Information

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Customer Reviews

I have the following reasons for loving this book:1. This book has one of the best explanations of the meaning of gradient, divergence, curl, and the Laplacian I've ever seen.2. The diagrams deriving the magnitude and direction of the centripetal acceleration vector are beautiful.3. I found the end of chapter problems "do-able" and there is a nice web-site to go along with the book showing complete answers and solutions if you get stuck.4. There is a gentle but rigorous introduction and explanation of covariant and contravariant vector components which is very nicely done.5. The book starts to get more abstract when it discusses tensors, tensor derivatives, and Christoffel symbols but the author does an excellent job explaining them along with giving examples of their use.6. The last chapter has 3 more very nice detailed examples of tensor use. Although I read the clear explanation of the first two (the inertia tensor and the electromagnetic field tensor), I omitted the end of chapter problems dealing with these examples since I wanted to concentrate my attention on the tensors involved with General Relativity. The author does a superb job explaining the foundations of General Relativity and the origin and use of the Riemann Curvature Tensor. Along with this he shows how the Ricci Tensor and Ricci Scalar come about. The author does a great job giving an example of how the Riemann Curvature Tensor is calculated for a 2-dimensional spherical surface.If I had anything I wish I could have seen it would be to have a little more explanation of the Ricci Tensor and the Ricci Scalar in the last chapter.

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